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ELECTRONIC COMMERCE SYSTEM

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RELATED APPLICATION(S)

This application claims priority from, and incorporates herein by reference, the entire disclosure of U.S. Provisional
5 Application No. 60/250,737, filed December 1, 2000.

TECHNICAL FIELD

The present invention relates to electronic commerce systems, and more particularly, to a system enabling interaction between legacy components of an electronic
10 commerce system.

BACKGROUND OF THE INVENTION

The expansion of the Internet has provided businesses and individuals with increased opportunity to perform business transactions (i.e., e-commerce) on a large scale. Today's e-commerce solutions are almost exclusively performed as unique, single implementation systems. A system must be implemented from scratch with no connection or interaction with other types of systems. This can create high implementation costs for individuals attempting to begin their own e-commerce business or for existing businesses expanding their business into the e-commerce realm.

Existing e-commerce transactions are normally classified as one of two types, business to business (B2B) and business to consumer (B2C). The reasons for this are the perceived differences between the functionality of the two tracks. However, there really are no great differences between the two types of e-commerce transactions. Both require strong authentication, connection to an underlying business system and a proven transaction engine. Existing systems are unable to interconnect the separate entities required for an electronic commerce transaction and integrate them into a single viable system. This requires each new e-commerce

solution to comprise a unique entity built from scratch. This causes the cost of launching and maintaining a system to be high in terms of initial investment and support.

A merchant wishing to implement a web shop today has two
5 choices. The merchant may host a complete web shop himself, complete with the required business system, access control systems, security systems, transaction systems, etc., or the merchant may outsource the entire operation to an independent service provider. Neither of these solutions are optimal.
10 When the merchant implements the system, the merchant is required to bear the cost of implementing and maintaining the hardware, software and human resources associated with the electronic commerce system. The second scenario, while less costly, is also less flexible for the merchant because all
15 changes in the web shop must be performed by the service provider. The second scenario also limits the amount of current information a merchant is able to obtain with respect to sales on the web shop.

In both of these cases, each consumer and merchant is
20 required to enter into a separate business relationship instead of negotiating a single relationship with a trusted third party. This means that a consumer doing business with

ten separate merchants must have ten separate deals, one with each merchant. Therefore, a need has arisen for a system enabling the integration of a plurality of different systems necessary for performing an electronic commerce transaction in
5 such a manner that does not require a complete construction of an electronic commerce system for a new merchant wishing to open a web shop.

SUMMARY OF THE INVENTION

The present invention overcomes the foregoing and other
10 problems with a system enabling the performance of electronic commerce transactions which includes a central controller for integrating together at least one of business systems, transaction systems, identification systems or presentation systems with the central controller enabling the exchange of
15 data relating to an electronic commerce transaction therebetween. The central controller provides logic to support an e-commerce transaction using the various systems. The solution enables the use of several access and security methods, not just one single method. The solution provides
20 for "multi channel" payments, meaning that a central controller offers to the Merchants one and the same payment

5 solution using different transaction media. Likewise, the
Consumers can pay using one and the same payment solution
using different transaction media. The solution is
transparent to which means of communications is used by
10 vendors and customers. Application program interfaces (API)
associated with the central controller enable communications
between the central controller and the business systems,
transaction systems, identification systems and presentation
systems. The APIs include at least a first layer supporting
15 a first communication protocol used by the central controller
and a second layer for supporting a second communications
protocol used by one of the other systems.

BRIEF DESCRIPTION OF THE DRAWINGS

15 A more complete understanding of the method and apparatus
of the present invention may be obtained by reference to the
following Detailed Description when taken in conjunction with
the accompanying Drawings wherein:

FIGURE 1 is a functional block diagram of the electronic
commerce system of the present invention;

20 FIGURES 2a and 2b illustrate communications through an
API;

FIGURES 3 provides a more detailed illustration of the API between the middleware and a legacy system;

FIGURES 4 provides an illustration of the various objects stored within the database of the middleware;

5 FIGURE 5 illustrates various logical applications included within the middleware;

FIGURE 6 illustrates an example of a browser transaction using the system of the present invention;

FIGURE 7 illustrates a mobile SMS transaction using the
10 system of the present invention; and

FIGURE 8 illustrates a business to business transaction using the system of the present invention.

DETAILED DESCRIPTION

Referring now to the drawings, and more particularly to
15 FIGURE 1, there is illustrated an electronic commerce system
10 operating according to the present invention. The
electronic commerce system 10 consists of a plurality of
legacy systems 15 such as a business system 15a, transaction
system 15b, identification systems 15c and presentation
20 systems 15d. The legacy systems 15 interact through a core
system 35 referred to as the middleware.

The middleware 35 implements a number of APIs 40 enabling communications between the various legacy systems 15 and the middleware 35. The middleware 35 also implements the core logic of the electronic commerce system 10 controlling how transactions are handled and how information is moved around within the electronic commerce system 10. The middleware 35 comprises an application server with EJB management, covering logic, implementation objects and database activity. The middleware 35 includes an application server 45 which manages the electronic commerce system's 10 internal logic and handles the provision of services amongst the various legacy systems 15. The middleware 35 is able to act as a service binder between each of the legacy systems 15. A call from one legacy system 15 may result in data retrieval from another legacy system 15 or may simply be handled by the core logic of the middleware. A database 55 stores system fundamental data, certificate relationships, names, identification of system members and system objects. All control of transactions are configured with the database 55 within the middleware 35 which is in turn used by the various core logic applications 45. A CORBA naming service 50 assists in controlling the APIs 40 in a IIOP fashion. The CORBA naming service 50 makes external

legacy systems visible to the middleware 35, using the APIs 40. The legacy systems 15 include the various systems necessary to perform an e-commerce transaction.

The business systems 15a comprise legacy systems 5 containing invoicing, consumer and merchant data and functionalities. As a practical matter, literally thousands of business systems exist. Most of these are tightly integrated with a company's daily operations and do not support standard protocols for communication with external 10 systems. The transaction systems 15b comprise a set of servers and legacy systems for managing financial transactions. This may consist of a server provided by a bank for a balance/withdrawal/deposit manager. The transaction systems 15b manage financial transactions and keep records of 15 the transactions. The transaction systems 15b handle tasks such as supporting standard APIs for micropayments, managing transactions between an Internet payment provider and a merchant, keeping track of payments and refunds, keeping track of customer's account balances and keeping track of merchant's 20 account balances.

The identification systems 15c comprise software and hardware enabling services to determine whether a consumer or

merchant is valid within a particular system. Identification systems 15c also manage the verification of purchases. Various examples of identification services include dial-in caller ID and external identification systems such as

5 customer databases, certificate generators, CID (caller ID) certificate verifiers and CID servers. Verification of purchases may be done using X509 certificates and replies to SMS messages. The presentation subsystems 15d comprise a set of hardware and software servers for offering a

10 graphical user interface to the electronic commerce system 10. For a merchant, the merchant's own web server comprises part of a presentation system 15d. For a customer, their Internet browser would comprise part of the presentation systems 15d. The presentation system servers offer common web

15 based UI (user interface) for merchants and consumers as well as for the administrative personnel like consumer support and administration.

The API 40 enable communications between the middleware 35 and the various legacy systems 15. Each API 40 contains

20 two adaptor layers, enabling the support of two different interface standards. CORBA and EJB adapters 60 enable communication with EJB interfaces and CORBA IDL interfaces.

Additionally, adapters using remote method invocation (RMI) and MQ (for mainframes) may also be used. The legacy system adapters 65 comprise small customized modules for each external legacy system 15 unable to communicate using the more common EJB and CORBA IDL interfaces. The legacy system adapters 65 speak the legacy system protocol, for example, XML message driven protocols, etc. The legacy system adaptors 65 are represented as API interfaces in either CORBA, IDL or EJB formats.

Referring now to FIGURES 2A and 2B, there is illustrated how the API 40 enables interaction between the middleware 35 and a legacy system 15 using either the CORBA and EJB interface 60 or the legacy system interface 65. As shown in FIGURE 2A, when the legacy system supports CORBA or EJB interfaces, the middleware 35 and legacy system 15 communicate directly. However, if the legacy system 15 does not support CORBA or EJB interfaces, the legacy systems adaptor 80 must be utilized to enable communication between the middleware application 35 and the legacy system 15.

Referring now to FIGURE 3, there is provided a generic illustration of an interconnection between the middleware 35 and a legacy system 15. The API 40 comprises two halves that

represent middleware and legacy identification systems,
respectively. The middleware portion 60 is part of the
middleware application 35. The legacy system portion 65 is a
customized portion. The two portions enable each system to
5 utilize each other's functionality. When integrating a legacy
system 15, the legacy system portion 65 is unique. The legacy
system portion 65 is customized for the particular legacy
system 15 with which the middleware 35 is connected. The
middleware portion 60 of the adaptor 80 virtually never
10 changes when integrating with a new legacy system 15. The
middleware 35 is completely invisible to the legacy system 15
and the same is true for the legacy system 15 with respect to
the middleware 35. The middleware 35 and legacy system 15
only "see" the adaptor 80. If the legacy system 15 supports
15 either EJB or CORBA interfaces, then the legacy system
portion 65 of the API 40 may become obsolete. However, some
type of initialization logic may be implemented within the
legacy system portion 90. Each API 40, whether
interconnecting the middleware application 35 to a business
20 system 15a, transaction system 15b, identification system 15c
or presentation system 15d, is configured in the exact same
manner. With the middleware portion 60 of the API 40 being

virtually unchanged for any application and the legacy system portion 65 uniquely configured to whichever legacy system 15 is being interfaced.

Referring now to FIGURES 4 and 5, there are illustrated
5 the various objects and applications which may be implemented within the middleware 35 in order to provide the middleware 35 with the ability to integrate the various legacy systems 15 into a cohesive electronic commerce system 10. The various objects are stored within the database 55 of the middleware
10 35. The applications are implemented within the server 45.

With respect to the identification legacy systems 15c the middleware 35 contains identification objects 120 which are mainly identification data used as parameters for any authentication or registration mechanisms. Examples of these
15 types of objects include consumer Social Security numbers 120A; caller ID numbers 120B; merchant organization numbers 120C; business partner receipts 120D, etc. The various applications associated with the identification applications
130 implemented within the middleware 35 include applications
20 that make it possible to manipulate, create, and search data within interconnected legacy systems 15. These include digital certificates generators 130A, encryption/decryption

workers 130B, single registration without authentication process 130C, single registration using a legacy identification process 130D, batch registrations 130E, and business object specific applications 130F.

5 Features provided by the middleware 35 relating to the business legacy systems include business objects 140 relating to consumers, merchants and transactions. Business applications 150 make it possible to manipulate, create and search data between two interconnected systems. The business
10 applications 150 enable updates, the creation of data, the deletion of data searching for particular data or other business object specific functions.

The transaction objects 180 and applications 190 include objects comprising data fetched from various databases and
15 bundled together logically in groups such as consumers, merchants, transactions, accounts and miscellaneous. Applications 190 associated with the transaction system include logic making it possible to manipulate, create and search data between two interconnected systems. Applications
20 190 may relate to updates, creation of data, deletion of data, searching for data and other business objects.

Features relating to the presentation legacy systems include objects 160 and applications 170 related to the presentation systems. Presentation objects are user-based sessions. Session objects 160 are role-based sessions wherein
5 access to various functionalities is restricted by the role played by the system user. Access can be limited to consumer sessions, merchant sessions, support sessions, or administration sessions. The session applications 170 create tags created specifically to be used in a web environment.
10 The applications 170 available to a user are highly flexible and can be easily redefined via updates, creation and deletion of data, searching, displaying and business object specific functions.

Using the above-described system a number of transactions
15 may be carried in the e-commerce arena. For example, various access methods may be used to confirm on-line purchases from a merchant's web site. Two exemplary methods for confirming on-line purchase involve either browser access (FIGURE 6) or mobile access via SMS (FIGURE 7). However, it should be
20 realized that the present invention is not limited to these types of confirmation access methods and other types may be implemented.

Within the browser access method, a merchant must adopt its own purchase transaction implementation on a web server 200 associated with a presentation system 15d. A verification is performed using the middleware 35. Confirmation is done
5 solely between the merchant web server 200 within the presentation system 15d, the consumer web browser 205 within the presentation system 15d and the transaction system 15b. The exact implementation of the purchase transaction depends upon the transaction system 15b used. The typical
10 implementation involves the use of a digital X509 certificate 210 installed within the web browser 205 of the consumer. Information about the certificate 210 is also stored within the transaction system 15b, and is used to identify the consumer's account in the transaction system 15b when
15 purchases are made. This normally means that purchases can only be made from a computer in which the consumer has a registered account, unless the certificate 210 is exported and copied to another computer. The only active role played by the middleware 35 in this case is for providing access between
20 the presentation systems 15d and the transaction system account 15b. When a consumer decides to purchase an item on a web shop, the consumer is prompted to choose a certificate.

A certificate is used to digitally sign a contract which is transmitted to the transaction system via the merchant's web server 200.

Using wireless technologies (FIGURE 7), it is possible to
5 verify payments using wireless hand held devices such as a mobile telephone. A mobile access system must be tightly integrated with the payment system. All transactions must be dispatched as quickly as possible to the payment system but be handled in a controlled way through the middleware 35 (not
10 shown). A mobile access system should handle two tasks, sending and receiving SMS messages and acting as a proxy server for account certificates. Merchants would fetch these certificates and use them when communicating with the transaction systems 15b (not shown).

15 The electronic commerce system 10 of the present invention may also be used in transactions between businesses as is illustrated in FIGURE 8. In this example, the electronic commerce system 10 enables the transaction to be dispatched directly between a first company 250 and a second
20 company 255 and acts as a trusted partner between the first company 250 and the second company 255. The electronic commerce system 10 manages the technical issues regarding the

dispatch of calls to the correct destination, and insures that the data format is kept constant between the two companies. The electronic commerce system 10 even has the capability of maintaining confidentiality with respect to customer data by
5 rendering it invisible to a requesting party. As a trusted partner, the electronic commerce system 10 acts as an independent party, legally detached from the buyers and the sellers, that ensures that transactions are processed in a controlled manner. The electronic commerce system 10 provides
10 protection from fraud, eavesdropping, and so on. While the present example illustrates an interconnection between only two companies, it should, of course, be realized that many more than two companies could be hooked up in this fashion enabling the exchange of data.

15 In the example of FIGURE 8, first company 250 requests at 260 the authentication of a particular customer and specific data related to this customer to the electronic commerce system 10. The electronic commerce system 10 takes this request 260 and forwards it in the proper format to a second
20 company 255 to request authentication data for this customer. The second company 255 forwards this information relating to the customer at 265 back to the electronic commerce system 10

which provides the information at 270 to the first company
250.

Using the foregoing system, an individual is able to more
easily create an electronic commerce system without being
5 required to completely build a system from the ground up.
Building blocks from previously existing legacy systems may be
utilized within various functionalities required for the
electronic commerce system using the middleware 35 such that
previously existing resources may be utilized.

10 The previous description is of a preferred embodiment for
implementing the invention, and the scope of the invention
should not necessarily be limited by this description. The
scope of the present invention is instead defined by the
following claims.